

# Books

---

## Introduction to Communication Science and Systems

J. R. Pierce and E. C. Posner, Plenum, New York, 390 pp., 1980, \$27.50.

*Reviewed by C. T. Russell*

This book is designed to serve as a textbook for a three quarter or two semester upper division or graduate course for beginners interested in the wide range of topics essential to communication systems. It covers antennas and transmission, thermal noise and its consequences, Fourier transforms, modu-

lation and noise, sample and pulse code modulation, autocorrelation and power spectrum, optimum filtering, gaussian noise and errors in digital transmission, data transmission limits on data rate, and source encoding.

The book is divided into 13 chapters, each of which is divided into about 10 sections, and each section is followed by a list of about three problems on the material in that section. A list of further reading is included for each chapter as is a comprehensive index. The book is written for students of electrical engineering, but the authors state in their introduction that physicists, earth scientists, and astronomers who must detect signals in their work can use this book to learn about the limits of detectability of signals. I would agree with the authors and say there is more than

that. I found many examples of techniques that I had heard of over the years and wondered at how they worked but had never delved into, such as convolutional coding (and decoding), which is used to reduce the number of bit errors in satellite transmissions.

It should be kept in mind that while a useful reference this is an introductory text. In the words of the authors, 'Proofs of key results are provided wherever practical. The proofs have been chosen for simplicity and insight. They may not always be the best proofs, but they do not require much previous knowledge of mathematics, and they present important concepts.' In short, a Born and Wolf it is not, just a friendly, fairly complete, introduction to communication science and systems.

*C. T. Russell is with the Institute of Geophysics and Planetary Physics, University of California, Los Angeles, California.*